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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/655,901 | 09/05/2003 | Youichi Akasaka | 2460 | 7660 |
| 28004 | 7590 | 02/10/2006 | | |
| SPRINT 6391 SPRINT PARKWAY KSOPHT0101-Z2100 OVERLAND PARK, KS 66251-2100 | | | EXAMINER HUGHES, DEANDRA M | |
| | | | ART UNIT 3663 | PAPER NUMBER |

DATE MAILED: 02/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/655,901 | Applicant(s) AKASAKA, YOUICHI | |
| | Examiner Deandra M. Hughes | Art Unit 3663 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-11 and 14-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-11, and 14-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>11/29/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed 11/29/05 has been entered.

Information Disclosure Statement

2. The information disclosure statement (IDS) filed on 11/29/05 has been considered by the examiner.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1, 4, 11, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 6,344,922 published Feb. 5, 2002) in view of Fludger (Pump to Signal RIN transfer in Raman Fibre Amplifiers, 2001).

****The references made herein are done so for the convenience of the applicant.**

The prior art should be considered in its entirety.

With regard to claim 1, Grubb discloses a communication system (fig. 5a) for distributed Raman amplification of optical signals (col. 2, lines 28-42), the communication system comprising:

- a first fiber span (1st instance of #30);
- a second fiber span (2nd instance of #30);
- and an amplifier system (2nd instance of #24, #26 and #31₁-#31_n)

configured to:

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- generate a first light beam (multiplexed via 2nd instance of #26; pumps #31₁-#31_n);
- split (via 2nd instance of #24) the first light beam into a first portion of the first light beam (coupled via 3rd instance of #26) and a second portion of the first light beam (coupled via 4th instance of #26);
- transfer the first portion of the first light beam onto the first fiber span to backward propagate over the first fiber span (first portion counter-propagates in 1st instance of #30);
- and transfer the second portion of the first light beam onto the second fiber span to forward propagate over the second fiber span (2nd portion co-propagates in 2nd instance of #30).

Further, Grubb discloses that the pump power can be varied (col. 5, lines 10-15).

However, Grubb does not specifically disclose an unequal power distribution between the forward and counter propagating pumps. Fludger teaches the effects of pump propagation direction on RIN transfer (entire article). It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was made to unequally distribute the power of the forward and backward propagating signals for the advantage of minimizing RIN transfer.

With regard to claim 4, col. 12, line 35 discloses the claimed gain.

Claims 11 and 14 are merely the method of normal operations of the apparatus as claimed.

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5. Claims 5-6, 8, 15-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 6,344,922 published Feb. 5, 2002) in view of Fludger (Pump to Signal RIN transfer in Raman Fibre Amplifiers, 2001), as applied to claims 1 and 14 above, and further in view of Fidric (US 6,603,593 published Sep. 19, 2001).

With regard to claims 5 and 16, Grubb in view of Fludger does not specifically disclose that a laser diode is configured to generate the first light beam. However, laser diodes as Raman pump sources are well known in the art. Further, it is taught by Fidric (col. 3, lines 20-25). It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was made to use a laser diode as a Raman pump source for the advantage of an inexpensive and readily available art-recognized pump source.

With regard to claims 6, 8, 15, and 18, Grubb in view of Fludger does not specifically disclose that the splitter is a 3dB splitter. However, Fidric teaches the use of a 3dB splitter (#20). It is well-known in the art that a 3dB splitter is so named because an equal division (50/50) of an input signal between two output ports causes a 3dB loss. It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was made to use a 3 dB splitter for the advantage of an inexpensive readily available splitter to even distribute the pump power signal.

6. Claims 7, 9-10, 17, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 6,344,922 published Feb. 5, 2002) in view of Fludger (Pump to Signal RIN transfer in Raman Fibre Amplifiers, 2001) as applied to claims 1

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and 14 above, and further in view of Agrawal (Fiber-Optic Communication Systems, 2002).

Grubb does not specifically disclose the claimed transmission fiber lengths or pump powers. However, Grubb discloses that one of ordinary skill in the art may construct an amplifier with a desired signal amplification range by varying the length and the pump powers. Further, Agrawal explicitly teaches these relations (pg. 244 - equations 6.3.2 and 6.3.3; pg. 245 - equation 6.3.5). It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was made to merely apply the explicit relations of Agrawal to the amplifier of Grubb for the advantage of optimizing amplification to achieve the desired signal amplification range.

Response to Arguments

7. Applicant's arguments with respect to claims 1, 4-11, and 14-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the


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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deandra M. Hughes whose telephone number is 571-272-6982. The examiner can normally be reached on M-F, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Deandra M Hughes
Examiner
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